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AUTHOR Heath, Walter D.; Spetz, Sally H.
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ABSTRACT

This curriculum resource guide, one of seven developed by the State of Illinois to present information on new and emerging curricula existing in the nation, can be used as a basis for local educators to determine the resources needed to offer swine confinement management curricula and to initiate curriculum development at the local level. Chapters 1 and 2 contain an introduction and procedures for using the guide. Chapter 3 describes the job duties and typical employers of swine confinement facility assistant managers. In chapter 4 alternative curriculum approaches are presented--an associate degree program and certificate program. Chapter 5 discusses these resources required to implement the program: curriculum advisory committee, facilities and equipment, and instructor qualifications. The final chapter contains eighteen abstracts of curriculum and instructional materials; information provided includes title, author(s), availability, and price. Appendixes include lists of schools offering coursework in swine confinement management, related agencies/organizations and journals/periodicals, and swine farmer competencies. (A report on the project that identified the seven new and emerging occupations is available as CE 024 423. See Note for other curriculum resource guides in ERIC.) (YLB)

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SWINE CONFINEMENT MANAGEMENT: A CURRICULUM PLANNING AND RESOURCE GUIDE

Walter D. Heath
Sally H. Spetz

CONSERVA, Incorporated
401 Oberlin Road
Raleigh, North Carolina

Sponsored by:

Illinois State Board of Education
Donald F. Muirheid, Chairman
Joseph M. Cronin,
State Superintendent of Education

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PREFACE

In 1978 CONSERVA, Inc. was awarded a contract by the Illinois Department of Adult, Vocational, and Technical Education (DAVTE) to identify new and emerging occupations within the State and to determine the types, levels, and distribution of new vocational education curricula which are needed to meet the employment demands for skilled workers in those occupations. To accomplish the objectives of the project, CONSERVA staff undertook a search for potential new occupations through a review of similar national research efforts, recently enacted Illinois legislation, and technical and trade journals. Telephone contacts to identify new and emerging occupations were made with over 450 individuals nationwide, representing industries, educational institutions, professional and trade associations, government agencies, labor unions, service organizations, and private employers.

Through these cumulative efforts, seven occupations were identified which met pre-determined criteria defining new and emerging occupations, i.e., 1) the occupation has come into existence within the past decade; 2) the occupation is skilled or technical in nature, requiring at least six months of vocational education preparation but less than a four-year college program; 3) there are no or limited vocational education programs within Illinois which are preparing students to enter the occupation; and 4) information is currently available which reflects an anticipated shortage of workers within the State over the next five years. The seven identified new and emerging occupations are:

- Biomedical equipment technician
- Industrial hygiene technician
- Podiatric assistant
- Therapeutic recreation technician
- Swine confinement facility assistant manager
- Solar energy technician
- Halfway house manager

In order to hasten the inauguration of curricula for these new and emerging occupational areas, the Illinois Department of Adult, Vocational and Technical Education (DAVTE) awarded a second contract to CONSERVA. The purpose of that project was to locate new and emerging curricula that are currently in existence in the nation, to obtain available curriculum documentation for each of the seven occupational areas and to incorporate that information into seven curriculum resource guides. This volume represents one of the products of that effort, a curriculum resource guide which can be used as a basis for initiating a curriculum for preparing Swine Confinement Facility Assistant Managers.

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I. INTRODUCTION

Swine Confinement Facility Assistant Managers assist managers or owners in the administration and operation of swine complexes. Swine confinement facilities constitute a major share of the Illinois hog production industry. An estimated 25% of the hogs produced in the State are raised in total confinement; a portion of the remaining stock are raised in partial confinement. Because many of the confinement complexes are large, owners or managers often require managerial assistance.

Illinois is experiencing a shortage in the supply of knowledgeable managerial personnel. It was estimated recently that there will be 690 openings for assistant managers of Illinois swine confinement facilities by 1983 (Spetz, et al., 1978). Present programs in hog production will be unable to satisfy this demand. A definite need exists for community colleges to respond to this pressing labor shortage by initiating additional programs for preparing swine confinement facility assistant managers.

This curriculum planning and resource guide was prepared to serve as a basis for local educators to determine the resources needed to offer swine confinement management curricula and to initiate curriculum development at the local level. The difficulties and expense of developing curricula for a relatively new occupation such as swine confinement facility assistant manager are well documented (Meleen, et al., 1976; Nelson, 1978; Spetz, et al., 1978; Forgione & Kopp, 1979). This guide is intended to facilitate curriculum development in Illinois by taking full advantage of related curriculum development efforts of institutions across the nation.

Essentially, the curriculum planning and resource guide is a synthesis of curriculum materials currently being used to offer training in swine confinement management. It consists of a description of job duties and competencies, suggested curriculum options, program resource requirements, abstracts of curricular materials, and appendices listing further sources of information. Information presented in the guide was obtained from existing curricula in swine confinement production (see Appendix A), which were identified through extensive contacts with State vocational education agencies, professional and trade associations and directories, and local institutions offering swine confinement management curricula. In most instances, representatives of swine complex management curricula graciously provided CONSERVA with documentation of available curriculum materials and offered assistance in identifying instructional materials, resource requirements, and other useful information. Contacts made with educational publishers and producers of audio-visual instructional materials served to identify and procure textbooks and other learning materials available for providing instruction in swine confinement management.

Suggested procedures for using the curriculum planning and resource guide are presented in the next chapter, which describes a five-step curriculum development process keyed to the contents of this guide. This is followed by chapters describing swine confinement facility assistant manager job duties, alternative curriculum approaches, and program resource requirements. The final chapter presents abstracts of available curriculum and instructional resources.

II. PROCEDURES FOR USE

Presented in this chapter are procedures for using this guide as a resource in the planning, organization and development of a curriculum in swine confinement management. The approach advocates the reliance on existing curricula which have been developed by other institutions. Though it is seldom practical or feasible for an institution to adopt an existing curriculum in its entirety, the work of others does offer a solid foundation upon which to base planning and development activities. The steps outlined below illustrate how the materials presented and referenced in this guide can be utilized in initiating a curriculum for swine confinement management, an occupation which has been determined new and emerging in Illinois, yet one for which there are established curricula in other parts of the country.

The curriculum development process is summarized in Table 1, accompanied by a rationale for each of the procedural steps and references to relevant sections of the resource guide. The procedures elaborated upon below assume experience in curriculum development on the part of the reader. Steps which are well-known to those with such experience are briefly outlined and tied in to relevant information presented in this guide. In those instances where traditional curriculum development procedures are not appropriate due to the newness of the occupation, further elaboration is provided.

Table 1.
Curriculum Planning and Development for New and Emerging Occupations

Step	Purpose	Reference
1. Determine area or regional employment opportunities and extent of student interest	To justify offering the program	Figure 1 Chapter III
2. Establish curriculum advisory committee	To obtain advice on the structure and content of the curriculum and the methodology to be utilized in instruction	Chapter V Appendices B, C
3. Verify, modify, and refine job competencies and/or duties	To align general duties with specific local employment requirements	Chapter III Appendix D
4. Assess resource requirements	To determine institutional capability to offer the program	Chapter V
5. Develop curriculum	To align resources with job competencies and student interests and qualifications	Chapters IV, V, VI

Step 1. Determine Area or Regional Employment Opportunities and Student Interest

The first step in planning a curriculum for swine confinement management is to determine the demand, in terms of employment opportunities and student interest, for offering training in the occupational area. Five-year projections of regional demand for swine complex assistant managers have been estimated using data on swine producers published by the Illinois and U.S. Department of Agriculture (Spetz, et al., 1978). These projections, which are portrayed in Figure 1, can serve as a preliminary estimate of employment demand. However, since the estimates are based on secondary sources of regional employment demand, they are subject to local fluctuations. Thus, if the regional estimates indicate a potential need for a program in swine confinement management, a more in-depth investigation of the demand should be undertaken. This will first involve conferring with other post secondary and/or proprietary schools in the region to determine whether any of those institutions are planning to respond to the need by developing similar curricula. Findings from such conferences could result in the need for joint developmental efforts or a determination that only one operating curriculum is necessary to meet the regional demand. In the latter case a joint decision between the institutions and the appropriate State agency as to the most qualified and/or cost-efficient institutions(s) to offer training should be sought.

The next step is to refine the preliminary demand estimates through a survey of the potential employment community. Job duties and typical employers of swine confinement assistant managers are listed in Chapter III of this report. That information may be used as a basis for the development of survey instrumentation and selection of a sample of employers. It will be necessary to include a job description in the instrumentation. This will ensure that employers are responding to similar positions even if the position is not referred to as a swine confinement facility assistant manager. Additionally, employers should be requested to list any discrepancies in the job description as compared to the duties of their assistant managers. Contacts made with employers during the survey process should further serve to reveal additional places of employment of swine confinement production curriculum graduates, to identify potential curriculum advisory committee members and/or participants in a cooperative vocational education program, and to stimulate community interest.

The other component of demand which is necessary to estimate prior to curriculum development is student interest in, and qualifications for, the swine complex management curriculum. This is particularly important for ensuring sufficient enrollment when large expenditures, particularly for equipment purchases and instructional costs, are anticipated. The information on job duties (Chapter III) and typical curriculum and course requirements (Chapter IV) can help to

Figure 1.
1978-1983 Regional Employment Requirements for Swine Confinement Facility Assistant Manager (Statewide Total = 690)

determine potential student interest in enrolling in a swine confinement management curriculum. Summaries of that information can be provided to career information or guidance centers and secondary school guidance counselors in the service area to obtain estimates of potential student interest.

When the necessary information on students' interests is not directly available from the career information centers or guidance counselors, it may be desirable to conduct a survey of potential students. The sample could include students enrolled at the institutions, secondary students enrolled in both public and private institutions, and selected out-of-school populations such as persons employed in the related field of beef production. Again, the information on job duties and curriculum and course requirements contained in Chapters III and IV can be summarized in the survey instrument. The results of the survey will not only provide information on student demand but also indicate the types of students the curriculum is most likely to attract—information that later will be useful in designing a curriculum. If the decision is made to offer the curriculum, these potential swine confinement management students should be made aware of its availability.

Step 2. Establish Curriculum Advisory Committee

The second stage of the development process, provided that sufficient demand exists for the curriculum, is to establish a curriculum advisory committee. Since the committee will be heavily involved in subsequent steps in the curriculum development process, it is imperative that in the selection of members adequate consideration be given to individuals' qualifications in light of the responsibilities of the committee. Potential members of a swine confinement management curriculum advisory committee are presented in Chapter V. Additionally, the institution may wish to include outside consultants on the advisory committee if insufficient local expertise exists. Since swine complex management is a relatively new field, it may be essential to solicit external, up-to-date information. This may be obtained from relevant agencies and organizations, in addition to consultants. Lists of potential consultants for developing a swine confinement management curriculum and relevant groups are presented in Appendices B and C, respectively.

At the first meeting of the advisory committee, it is suggested that procedures for the operation of the committee, extent of authority, principal objectives and time schedules be established. Subsequent responsibilities of the committee will be to ensure that the curriculum is consistent with employer requirements and to facilitate placement of students.

Step 3. Verify, Modify and Refine Occupational Competencies and/or Duties

The derivation of job competencies can be a time-consuming and difficult task, particularly for new and emerging occupations. An alternative is to verify and refine existing competencies and/or task listings. Various lists of occupational competencies and tasks of the swine farmer, which supplement job duties described in Chapter III, are presented in Appendix D. These should be reviewed and refined to reflect unique and general employment requirements of the institution's service area. Input from the curriculum advisory committee and/or employers surveyed in Step 1 will facilitate the accomplishment of this process.

Employer input may be obtained concurrently with the survey conducted in Step 1 by appending a list of tasks or competencies to the survey questionnaire. Employers are requested to rate tasks, manipulative and communication skills, and technical knowledges as to their relevance to the occupation. For example, a five-point rating scale could be applied to a list of skills.[1]

5 - The skill is essential
4 - The skill is very important
3 - The skill is desirable
2 - The skill is not important
1 - The skill is not applicable

A similar scale could be applied to the rating of tasks and technical knowledges. Employers should also be given the opportunity to add to or modify the presented skills, tasks, and technical knowledges. Based on the employer ratings

[1] From Johnson County (Kansas) Community College, Office of Institutional Research. "Employer Manpower Needs and Job Entry Requirements for Biomedical Equipment Technician."

and similar input from curriculum advisory committee members, job competencies can be refined to reflect the needs of the service area. These refined competencies should then be used in defining segments of a swine complex management curriculum.

Step 4. Assess Resource Requirements

In order to determine the capability of an educational institution to offer the curriculum, it is necessary to assess the capabilities of the instructional staff, facilities and equipment available to provide students with the needed manipulative skills, technical knowledge and communication skills. The available resources will have a definite impact on the structure of the curriculum developed in the next step. For example, if equipment necessary for teaching laboratory skills is not available, a cooperative program may be considered.

The types of equipment, facilities and instructors necessary for implementing a swine complex management curriculum are presented in Chapter V. With the assistance of the curriculum advisory committee, suggested resources should be evaluated in light of the refinements in job competencies made in Step 3. Additions or changes to resource requirements may be necessary to align them with unique area or regional employment requirements. The resources of the institution should then be assessed as to whether they are adequate to meet the requirements of the curriculum. Where resources are lacking, outside assistance could be solicited; e.g., equipment contributions from manufacturing firms, supplementary guest lectures, equipment demonstrations by suppliers or field trips. Cooperative arrangements with owners or managers of swine facilities, consisting of on-site learning opportunities for students, could also serve to lessen the burdens of expenditures for equipment and instructional resources.

Step. 5. Develop Curriculum

At this point, it will be appropriate to determine the curriculum objectives and course progression, instructional materials, and methods and modes of instruction to be used in teaching students the necessary competencies to function as assistant managers of swine confinement facilities. Curriculum advisory committee input is most important during this phase of the curriculum planning process. Suggested curriculum options, which are based on swine production curricula currently in use in institutions across the nation, are presented in Chapter IV. Dependent on institutional resources, area or regional competency requirements, and anticipated student interests and qualifications, one or a combination of the curriculum options may be selected. Curriculum and coursework content may then be modified or expanded to address curriculum objectives and unique service area and institutional requirements. Other curriculum guides and materials obtained from existing programs are abstracted in Chapter VI. These guides and materials may be of further use in determining the appropriate curriculum and will be available for local review from the East Central Curriculum Coordination Center in Springfield.

Once the curriculum has been outlined and course objectives established, appropriate instructional materials for achieving the objectives will need to be identified. This process can be facilitated by reviewing the abstracts of instructional materials presented in Chapter VI. The abstracts should be reviewed with the following considerations in mind:

- Relationship of the material to course objectives
- Consistency of the material with mode and methods of instruction
- Compatability of the material with students' anticipated levels of achievement
- Effectiveness of the material in presenting information
- Cost-effectiveness of the material

Selection of materials for instruction should of course be preceded by a critical review of the actual documents, audio-visual, materials, etc.; however, alternatives may be narrowed down by examining abstracts contained in Chapter VI. A majority of the materials abstracted have been procured and will be made available by DAVTE to local educators for further review, preview and assessment of learning possibilities.

The steps outlined in the foregoing discussion represent an approach to curriculum development that relies heavily on the developmental efforts of others. However, it is not suggested that an existing curriculum be adopted in whole without giving due consideration to the transferability of such components as regional employer requirements, student needs, and resource and institutional requirements. The value of a curriculum advisory committee in addressing these considerations has been stressed throughout the curriculum development process. If the recommended steps are taken in the planning and development of the curriculum, the guide may serve to eliminate duplication of effort and as such can represent a cost-effective approach to curriculum development.

III. JOB DESCRIPTION

This chapter describes the job duties and typical employers of swine confinement facility assistant managers. The information is intended for use during two steps of the curriculum planning process. First, it can serve as a guide when contacting employers and students to determine employment opportunities for assistant managers and student interest in enrolling in a swine confinement management curriculum. Secondly, the general information on job duties and the specific competencies presented in Appendix D can be reviewed, modified and refined by employers and advisory committee members so as to ensure that the curriculum will be responsive to the specific swine confinement managerial occupational skills needed in the service area.

The assistant manager of a swine confinement facility has a wide range of administrative and operational responsibilities and duties. Also, since the manager is often the facility owner and may have other responsibilities, the assistant manager frequently fills a leadership role in several areas. In the administrative area the assistant manager assists in production schedules, identifying facility and equipment needs, and purchasing supplies and equipment. The assistant manager aids in the recruiting, hiring, training and supervising of other employees. Maintaining production and cash flow records, and making profit/loss projections are additional duties. Coordination of swine movement among the nursing, farrowing and finishing stations is an important responsibility. The assistant manager designs programs to maintain animal health through proper sanitation and disease prevention practices. He or she assists in determining the proper weight and quality of hogs to market and in selecting the time and market site for selling the animals. In the operational area the assistant manager selects swine to improve herd quality and chooses the hogs to be bred. Determining quantity and type of feed rations is a critical responsibility. Routine activities are castrating, clipping needle teeth and vaccinating swine. Because swine are sensitive to heat, an important duty is operation of the heating/air conditioning/ventilation system. The assistant manager inspects the herd regularly to identify and correct problems.

In addition to employment in swine confinement facilities, persons with the capabilities described above are employed by firms such as feed and equipment companies, which sell goods to swine producers. The marketing and meat packing industries constitute other sources of employment for graduates of a swine confinement management curriculum.

A U.S. Office of Education study identified the essential agricultural competencies needed for entry employment and advancement as a swine farmer (McClay, 1978). Since the term swine farmer is a generic job title for swine production,most of the competencies identified for swine farming are required in the specialized operation of a swine confinement facility. These competencies are presented in Appendix D.

IV. CURRICULUM APPROACHES

This chapter provides information on the structure of swine confinement management curricula and the content of specific courses designed to provide students with the various skills and technical knowledges necessary for employment as swine confinement facility assistant managers. The curriculum structure and content reflect alternative approaches currently in existence. Each alternative is presented for consideration in light of institutional resources and service area needs; they are intended to serve as a framework which can guide in developing swine confinement management curricula within Illinois.

Community colleges have demonstrated that either an associate degree or certificate program is effective in developing the capabilities required for swine confinement facility assistant managers. An associate degree-granting program generally emphasizes the administrative and technical knowledge required to manage a swine complex, the manipulative skills used in caring for swine and general education courses supportive of the assistant manager's role. A distinguishing feature of the associate programs, as contrasted with certificate programs, is their effort to provide the student with capabilities extending beyond swine production into general farm management. In addition to classwork, students participate in practicums where they are able to observe and discuss with managers and other employees various aspects of swine production, as well as apply under supervision the theories and principles learned in the classroom. This cooperative approach to education is instrumental in maintaining the relevance of instruction in terms of swine production knowledge, procedures, and equipment. Completion of an associate degree requires at least four semesters. Programs may vary as to whether the practicums are conducted during fall and spring semesters, or are offered during the summer.

Certificate-granting programs generally require two semesters of coursework and field experience either within the regular school year or during the summer. The shorter time period of a certificate program compels community colleges and technical institutes to stress the specialized knowledge and skills required in a swine confinement operation, while omitting from the curriculum general farm management/production courses. Complementary general education courses typically are included. As in the associate degree programs, an integral component of the certificate program is the field practicum.

The types of approaches a community college should adopt to prepare assistant managers of swine confinement facilities will be dependent upon factors such as employment demand, students' needs and interests, and institutional resources. The information needed to make this determination will be collected in the employer and student surveys (Step 1) and the assessment of institution resources and curriculum resource requirements (Step 4) in the curriculum development process described in Chapter II.

Associate Degree Program

The associate degree curriculum in swine confinement management provides students with a basic foundation in farm management and production, along with the more specialized knowledge and skills required in swine production. In the farm management area, coursework focuses on agricultural economics and finances, resource (land, labor, equipment, capital) allocation, record keeping, soil usage and crop production. The swine courses include topics such as swine selection, breeding, nutrition, disease control and marketing. To increase their effectiveness in communicating with and relating to employees and others, students take courses in composition and human relations or psychology.

Swine confinement management curricula usually are located within more general programs such as agricultural production, animal science or farm management. Typically, swine confinement management is not a formal option within these programs. Students selectively choose from among the elective course offerings to design a plan of study emphasizing swine complex management. In some cases, a formal option such as livestock production may be available. In these instances, students design, with guidance from their advisors, an individualized study plan stressing their career interests; e.g., swine, beef or sheep production.

This general approach provides students with a background in farm management along with the technical skills necessary to manage a confinement operation. Students benefit by having more occupational flexibility than a strict swine production program would provide; this is of special importance given the high turnover rate in swine production facilities. Employers gain by having employees who can contribute to areas in addition to the swine operation, such as crop production.

A suggested curriculum for an associate degree program is outlined below. The course of study is based on an analysis of well-known swine confinement production curricula. Course descriptions follow the curriculum outline.

Course	Semester Credit Hours
Introduction to Agricultural Careers	1
Introduction to Swine Production	3
Animal Health	3
Livestock Reproduction	3
Livestock Nutrition	3
Farm Records	3
Facilities and Equipment	3
Agricultural Mathematics	3
Swine Complex Management	3
Agricultural Economics	3
Soil Use	3
Livestock Selection	3
Farm Management	3
Crop Production	3
Agricultural Product Marketing	3
Forage Production	3
Meat Evaluation	3
Agricultural Finance	3
Field Experience	12
Basic English Composition	3
Human Relations or General Psychology	3
Total Hours	70

Introduction to Agricultural Careers. In this course students are exposed to the broad spectrum of employment opportunities in the agricultual field. Agricultural and related

occupations are explored in terms of responsibilities, duties, working conditions, financial and other rewards, and educational and/or experimental requirements. Through working closely with the agricultural and counseling staff of the college, students should complete the course with a greater awareness of their educational and career goals.

Introduction to Swine Production. The basic principles and practices of swine production in a confinement facility are surveyed in this course. The topics include selection, breeding, nutrition, health and disease control, records and marketing.

Animal Health. The maintenance of healthy livestock is the concern of this course. Normal physiological signs are described. Principles of disease prevention and parasite control are covered. Types of diseases and parasites, symptoms and treatment measures are included. Legal regulations relating to the treatments of choice are presented. Vaccinations and other routine medical or surgical procedures are described. Proper waste disposal methods are reviewed.

Livestock Reproduction. This course covers the fundamentals of reproductive physiology and breeding of swine and beef. Principles of animal genetics, breeding systems and procedures (including artificial insemination), and care of the female and offspring are given.

Livestock Nutrition. This course provides the student with basic knowledge necessary to design a nutritious feed program for a confinement operation. The nutritive needs of swine and beef for protein, minerals, vitamins, energy, antimicrobial agents and water are covered. The course presents types of feed and feed supplements, their nutritive characteristics and costs. Balanced rationing is discussed in detail.

Farm Records. The recording and use of information for planning and management are the topics of this course. The types of records to be maintained, including inventory; purchase of equipment, supplies, and labor; feed; and production, are described. Principles of bookkeeping, business analysis and planning are presented.

Facilities and Equipment. This course focuses on the building and equipment necessary for a successful confinement operation. Types of housing facilities; breeding, feeding, waste control, and health-maintenance equipment; financial costs; and space requirements are covered.

Agricultural Mathematics. This course provides students with the mathematical skills necessary for agricultural occupations. Students learn to calculate land areas; storage capacity; application rates of fertilizer, seeds, chemicals, and herbicides; material estimates; depreciation; machinery operating costs; production rates; financial records; ratios; markups, and soil conservation.

Swine Complex Management. This course focuses on the problems and decisions confronting a swine confinement facility manager. Drawing upon the other courses in this curriculum, the course reviews aspects of production, budgeting and marketing from a management perspective. Employee recruitment, supervision, evaluation and relations are an integral component.

Agricultural Economics. The role and nature of agriculture within the nation's economy is the central concern of the course. The types, size and relationships of agricultural industries with other segments of the economy are traced. The course identifies the factors influencing agricultural prices. Current problems and trends within the agricultural sector are presented.

Soil Use. This course concentrates on the use and management of soil.The formation and physical, chemical, colloidal and biological properties of soil are described. The conditions that affect plant growth and yields are presented. Soil management practices regarding sampling, testing, fertilization and conservation are outlined.

Livestock Selection. The evaluation and selection of livestock for the purposes of herd improvement are the subjects of this course. Breed histories, pedigrees and desirable characteristics of swine and beef are presented. Principles of selection and judging, and use of tools and performance programs are described. Market classes and grades of swine and beef are used to examine live animal/carcass value relationships. Field trips to area farms will allow students to apply their classroom knowledge.

Farm Management. This course focuses on the principles of farm management. Factors affecting profits, including production rates, size and efficiency of land; labor; equipment, and capital utilization, are covered. Proper record keeping, budgeting and planning are stressed. Procedures for filing tax reports are described.

Crop Production. The fundamentals of field crop production are covered in this course. Seed variety, characteristics and selection factors are presented. Planting practices, including seedbed preparation, seed rates and planting depths, are described. The design of fertilization programs is given. The course includes approved chemicals and application methods to control diseases, insects and weeds.

Agricultural Product Marketing. This course examines the principles of marketing agricultural products, including those applying to pricing, margins and costs. Price determinants such as competition and seasonal supply cycles are studied. The characteristics of area and terminal livestock marketing facilities are outlined.

Forage Production. This course examines the production of forage crops as related to animal production. The variety and characteristics of forage are presented. The uses of fertilizer and other chemicals are discussed. The course also covers tillage methods and management practices for the development and maintenance of pastures.

Meat Evaluation. The principles and methods of animal and carcass meat evaluation are presented in this course. Current industry practices are reviewed. Gross anatomy, body composition and carcass composition—and their relationship with carcass grading, classification and value—are covered.

Agricultural Finance. This course provides students with the functions and uses of credit in the operation of a farm enterprise. Credit sources and how to obtain credit are described. Interest rates, collateral, profit and loss statements, and net worth statements are covered. The course presents methods for determining repayment capacities and credit management. The importance of cash flows and business continuity are emphasized.

Field Experience. Students are given the opportunity to gain practical experience in the operation of a swine confinement facility in this course. Students work in area confinement complexes where they perform under supervision duties typical of a facility employee.

Certificate Program

Certificate programs are a second approach community colleges may utilize to prepare assistant managers of swine

confinement facilities. These programs focus upon the skills and technical knowledge needed in a swine confinement operation. Similar to the associate degree program in this regard, certificate programs generally include swine reproduction, nutrition, health maintenance, facilities and equipment, record keeping, complex management and general education courses. Lacking in the certificate curriculum are some of the more general agricultural production and farm management courses composing the associate degree curriculum. Field practicums give students the opportunity to apply and refine their classroom learning under supervision and actual work conditions in swine confinement operations.

A certificate program is appropriate in several situations. In areas with a high demand for confinement managerial personnel, a certificate program would be responsive in terms of addressing this need in a relatively short time span. Some community colleges are experiencing a significant attrition of agricultural students in associate degree programs because of the high employment demand in this field. Inclusion of a certificate curriculum within the two-year swine production curriculum would provide students who elect to leave after one year of successful study with tangible evidence of their accomplishments. Because of its relatively limited time commitments, a one-year curriculum would also appeal to persons employed in swine production or related fields who would like to upgrade their competencies.

An outline for a two-semester curriculum is presented below. The curriculum is based on a comparison of existing certificate curricula. The same courses are found in the associate degree curriculum described in the previous section. Therefore, the course descriptions are not repeated here.

Course	Semester Credit Hours
Introduction to Swine Production	3
Animal Health	3
Livestock Reproduction	3
Livestock Nutrition	3
Farm Records	3
Facilities and Equipment	3
Agricultural Mathematics	3
Swine Complex Management	3
Field Experience	6
Basic English Composition	3
Human Relations or General Psychology	3
Total Hours	36

Discussion

As is noted from a review of the curricula presented in the foregoing sections, many of the courses comprising a swine confinement management curriculum are components of more general agricultural production programs. For example, the courses in farm management, farm records, crop production and soil use are common in most agricultural programs. Furthermore, since many livestock production concepts and principles are generalizable across species of farm animals, general courses such as livestock (swine, beef, and/or sheep) production, nutrition and animal health are suitable for a swine confinement curriculum. Thus, a community college or technical institute with a comprehensive farm production program would be required to institute a minimal number of new courses to initiate a swine confinement management curriculum. Dependent on the specific competencies desired by employers, an introductory course in swine production and a more advanced course in swine complex management may be the only new courses required to develop a curriculum. Additional developmental work will of course be involved in making cooperative arrangements with area swine confinement facilities for student practicums.

The Illinois community college system currently possesses many of the resources requisite to establishing a curriculum in swine confinement management. Seventeen community colleges have approved agriculture production programs (Illinois Community College Board, 1977). Thus the system is in a position to respond to Illinois' critical need for assistant managers of swine confinement facilities.

V. RESOURCE REQUIREMENTS

Several of the more critical resources needed for a successful curriculum in preparing swine confinement facility assistant managers are discussed in this chapter. This information should serve as useful guidelines for community colleges in assessing their current capabilities to initiate a swine complex management curriculum and in determining what additional resources must be acquired. The chapter focuses on: (1) the curriculum advisory committee, (2) the facilities and equipment and (3) the instructors.

Curriculum Advisory Committee

An active, knowledgeable curriculum advisory committee is an essential force in the development and maintenance of a superlative curriculum. In the developmental stage, the committee provides guidance on instructional objectives, curriculum content and structure, facilities and equipment, and sources of instructional expertise. After a curriculum is established, the committee continues to provide support by assisting in cooperative arrangements and job placement; reporting developments in the field which require curriculum or facility modifications or equipment acquisitions; evaluating the performance of graduates and recommending curriculum modifications based on the evaluation, and serving as a link between the school and the community.

The curriculum advisory committee should have a broad perspective of not only swine confinement production, but also how production relates to the remainder of the swine industry and other allied businesses and service providers. Vital members of a committee are owners and managers of swine confinement complexes of varying sizes. Companies supplying the goods needed in a swine operation such as those involved in feed, pharmaceuticals and equipment sales are possible employers of curriculum graduates and constitute a resource the community college may draw upon. The marketing and meat packing industries are others. Community colleges should consider membership from those offering services to producers; e.g., veterinarians, attorneys, bankers and agricultural mechanics. A community college should not overlook the possibility of involving a swine specialist and agronomist from the State extension service staff. Other potential representatives on the advisory committee are instructors in vocational agriculture, drawn from the area high schools. Frequent consultation with the high school vocational agriculture instructors during the planning of the curriculum, and particularly in matters of effecting the most efficient articulation between the two levels of vocational education, may be of great importance. Faculty from higher-level educational institutions could help in structuring a curriculum suitable for providing transfer credit. Once the curriculum is established, current or former students could offer valuable insight into curriculum areas in need of improvement. Educators from existing swine confinement programs and members of swine or related organizations are other sources of information. Lists of possible consultants and related groups and associations are presented in Appendices B and C.

Facilities and Equipment

The two primary facilities used by a swine confinement curriculum are classrooms and laboratories. The curriculum has standard requirements for class space on a square footage per student basis. The laboratory requirements are more extensive. An essential resource for any swine program is a confinement laboratory in which students can observe and work in swine production. Most typically, colleges secure the cooperation of area producers who allow students to visit their facilities on class field trips and to work in them during their practicums. A second alternative is the ownership and operation of a swine confinement laboratory by the college itself. The major impediment to use of this approach is the initial capital needed to build and equip the facility, and to purchase breeding stock and supplies. For example, to establish a laboratory capable of handling 8-10 litters every six weeks, with 6 finishing pens capable of holding 30 swine per pen, and replete with a partially-slatted floor ten feet wide, eight feet deep running the length of the building would cost approximately $35,000. Kirkwood Community College in Cedar Rapids, Iowa, has a laboratory similar to this one. The facility is able to cover its annual operating budget of $20,000 (an average figure) through swine sales.

Because most of the instruction requiring use of equipment typically occurs during the practicum on area farms, colleges do not have to expend large sums on equipment. Types of equipment a college may wish to purchase for demonstration purposes are a pregnosticator; backfat indicator; animal handling equipment such as halters and rings, syringes, and ear notching tools; and a record wheel.

Instructors

The type of swine production instructor most preferred by community colleges has a bachelor's or master's degree in an agricultural field and several years of applied experience. Appropriate agricultural majors include animal science, agricultural education, agricultural engineering, agronomy and agricultural economics. While a college degree is an asset for an instructor, at least one of the colleges surveyed has had much success with a teacher who has a high school degree and many years of successful swine production experience. In addition to production experience, other backgrounds which would add to an instructor's qualifications include work in agricultural sales and marketing and meat packing. Prior teaching experience, preferably in a high school vocational agricultural program, would also enhance an instructor's credentials.

VI. ABSTRACTS OF CURRICULUM MATERIALS

This chapter presents abstracts of curriculum and instructional materials that were identified during the process of procuring curriculum information from swine confinement management programs. First, an abstract of the supplementary document containing curriculum materials that were obtained from existing programs is presented. The document will be useful as a supplement to this guide in planning and developing a swine confinement management curriculum.

This is followed by abstracts of textbooks and references and instructional material/equipment/facility catalogs. These instructional materials provide a good foundation for offering coursework in swine confinement management. An additional source of learning materials is local equipment manufacturers or distributors. Equipment manuals are frequently used as instructional resources, and their availability should be investigated during equipment procurement. Other supplementary resources are journals or periodicals and standards. A list of relevant journals and periodicals is presented in Appendix E.

While the instructional materials presented in this guide provide a good foundation in terms of available instructional materials, the reader is advised to keep informed of new developments in the ever-changing field. Reading current literature, e.g.; journals and newsletters, is one means of keeping informed. Additionally, by maintaining close contact with curriculum advisory committee members and employers of graduates of the swine curriculum, instructors will be able to adapt their programs of instruction to keep in step with technological advancements.

Title: SWINE CONFINEMENT FACILITY MANAGEMENT: SUPPLEMENTARY CURRICULUM MATERIALS
Compiled By: CONSERVA, Inc.
Available From: East Central Curriculum Coordination Center
100 North 1st Street
Springfield, IL
Year: 1979

This document was compiled and bound by CONSERVA, Inc. and consists of curriculum outlines, course descriptions and course objectives used in various post-secondary vocational education programs across the country. The following is a list of community colleges, universities and technical institutes represented in the documents:

- Black Hawk College
- Hawkeye Institute of Technology
- Kirkwood Community College
- Kishwaukee College
- Western Iowa Technical Community College

CURRICULUM GUIDE

Title: ANIMAL SCIENCE AND INDUSTRY
Author: Duane Acker
Publisher: Prentice-Hall, Inc.
Old Tappan, NY 07675
Year: 1971
No. of Pages: 604
Cost: $18.95

This book is designed for use as an introductory textbook in animal science. It covers dairy and beef cattle, swine, poultry, sheep, horses and ponies. The textbook provides a survey of the total animal industry, from the bases for genetic improvement to meat, milk, egg and wool utilization trends. The book is organized for efficiency in subject matter coverage to save time for both student and instructor. The material is not divided according to species. Rather, most topics, such as selection of feeders, reproduction, the business of feeding, markets, meat processing or milk secretion, include consideration of all species. Individual chapters are provided on the business of dairying, producing eggs and producing poultry meat; on the products — wool, milk and eggs; and on horses and ponies. (Excerpts taken from Author's Preface.)

TEXT OR REFERENCE

Title: FEEDS AND FEEDING
Author: Arthur E. Cullison
Publisher: Reston Publishing Company, Inc.
Reston, VA 22090
Year: 1979
No. of Pages: 595
Cost: $15.95

This book was written primarily as a text for an undergraduate course in feeds and feeding. It presents up-to-date principles of animal nutrition for beef and dairy cattle, horses, sheep and swine. Numerous tables provide specific data gleaned from National Research Council Publications; all aspects of animal nutrition are discussed, from roughage requirements to the trace minerals necessary for good growth and livestock production. Measurements are presented using both the English and metric systems. The book is organized into sixty-nine chapters. (Excerpts taken from cover flap.)

TEXT OR REFERENCE

Title: HOG INFORMATION PLEASE, VOLUME III
Publisher: National Hog Farmer
1999 Shepard Road
St. Paul, MN 55116
Year: 1976
No. of Pages: 254
Cost: $5.00

This publication is a compilation of questions and answers appearing in the periodical, *National Hog Farmer*, for the years 1970 through August 1975. The information is presented in seven major sections: 1) general management, 2) breeding, 3) farrowing and lactation, 4) feeding and nutrition, 5) health, 6) housing and equipment and 7) marketing. The major sections are divided into subunits to provide the reader with easy access to needed information. For example, the breeding section is subdivided into breeding traits and breeding, bore management, breeding management, reproductive problems, recessive genes and mulefoot hogs. The book also contains 79 sketches of building and remodeling plans.

TEXT OR REFERENCE

Title: LIVESTOCK BREEDING
Author: Roger D. Roediger
Publisher: Ohio Agricultural Education Curriculum Materials Service
2120 Fyffe Road, Room 254
Columbus, OH 43210
Year: 1977
No. of Pages: 190
Cost: $3.75

This manual is intended to be a basic unit of study dealing with the selection and breeding of livestock for students of vocational

agriculture. Factual information is presented in such a way as to lead to the forming of generalizations, principles and concepts that may in turn be applied in solving practical problems that arise in the selection and breeding of livestock. The manual presents general information which applies to all species of livestock. The generalizations, principles and concepts that are developed in this way are then applied to specified problems dealing with the dairy, beef, swine and sheep species of livestock. In style and organization, the manual lies somewhere between the lesson unit outline and the traditional textbook approach. The material is presented in outline form with the required information for teaching the lesson. It is intended to be used in assisting students in solving real-life problems in the area of livestock breeding. The unit may be taught as a whole, or teachers may select those parts which, in their judgment, are most important to their students. Research information is used to support the generalizations, principles and concepts that are developed. Practical student problems and exercises are suggested throughout the manual. A set of transparency masters has been developed and is coordinated with the use of this manual. The 12 chapters of the book are entitled: (1) The Value of Quality Livestock, (2) Chromosomes—"Key" to Traits, (3) Role of the Male in Reproduction, (4) Role of the Female in Reproduction, (5) Bridge of Life, (6) Gestation, (7) Rebreeding, (8) Fertility Problems, (9) Progress through Selection, (10) Mating Systems, (11) Selection by Individual Performance, (12) Selection by Pedigree and (13) Selection by Progeny. (Excerpts from Author's Foreword).)
TEXT OR REFERENCE

Title: MEAT EVALUATION HANDBOOK
Author: Lowell E. Walters and others.
Publisher: National Livestock and Meat Board
444 N. Michigan Avenue
Chicago, IL 60611
Year: 1977
No. of Pages: 70
Cost: $6.00

This book provides standards to be used in the evaluation of beef, pork and lamb. The book was designed to be used by college meat-animal science teachers and students. Pork evaluation is discussed in terms of pork carcasses, pork legs (fresh hams), pork carcass class, pork leg (fresh ham) class and pork grading. The book is liberally illustrated with vivid color photographs portraying meat evaluation standards.
TEXT OR REFERENCE

Title: NUTRITION OF FARM ANIMALS
Author: Leslie D. Kamstra
Publisher: Kendall/Hunt Publishing Company
Dubuque, IA 52001
Year: 1975
No. of Pages: 207
Cost: $6.95

This book provides an overview of the various facets of the animal nutrition field. The first chapter introduces the reader to the nutrients animals consume. The remaining six chapters follow the nutrients through the animals' systems. Chapters 2 and 3 describe alteration of nutrients by animals following intake of foods for nonruminants and ruminants, respectively. Chapter 4 discusses the absorption of nutrients after digestive simplication. General metabolism and the functions of minerals and vitamins as metabolic factors are the subjects of Chapter 5. Chapter 6 discusses the conversion of digestive products to complex animal structures, energy or excretory materials. Excretion of digestive and metabolic products is covered in Chapter 7. The six appendices present information on standardization and new units of energy measurements, routine analysis of feedstuffs, animal nutritional requirements, use and application of feeding standards, metric conversion tables and feedstuffs ingredient analysis table.
TEXT OR REFERENCE

Title: PORK INDUSTRY HANDBOOK
Publisher: Illinois Agricultural Extension Service
University of Illinois-Urbana
Urbana, IL 61801
Year: 1979
No. of Pages: N/A
Cost: $15.00

The *Pork Industry Handbook* is a compilation of articles written by some of the leading authorities in the country on swine matters. The publication of the handbook is coordinated by Purdue University. A project advisory committee, primarily comprised of State extension service members, selects the topics about which articles are to be written and identifies a leading authority to act as the senior author of each article. Currently the handbook contains 58 articles; 5 more are in print, and 18 additional ones are in some stage of development. A subscriber to the handbook service receives new articles as they are printed, and updated versions of previously published articles. The articles may be grouped into ten categories: 1) general, 2) breeding, 3) reproduction, 4) nutrition, 5) waste, 6) housing, 7) system, 8) management, 9) pork quality and 10) marketing.
TEXT OR REFERENCE

Title: PROFITABLE PORK PRODUCTION
Authors: Multiple authors of each unit
Publisher: Farmland Industries, Inc.
P.O. Box 7305
Kansas City, MO 64116
Year: Undated
No. of Pages: 208
Cost: $25.00 (bulk discount rate available)

This set of materials was prepared under the direction of personnel in the Schools Division of Farmland Industries, Inc. to serve as a text for its home study course on swine production. The course is divided into seven units: 1) Characteristics of Swine, 2) Herd Management, 3) Swine Nutrition, 4) Swine Health, 5) Capital and Labor Requirements, 6) Facilities and Equipment and 7) Marketing and Economics. The materials may be purchased for use in swine productions courses in community colleges.
TEXT OR REFERENCE

Title: THE SCIENCE OF ANIMAL HUSBANDRY
Authors: James Blakely and David H. Bade
Publisher: Reston Publishing Company, Inc.
Reston, VA 22090
Year: 1979
No. of Pages: 516
Cost: $14.95

This introductory textbook for college and university animal science courses presents a wide range of information on the history, reproduction, feeding, management and health care of the most important breeds of beef and dairy cattle, sheep, swine, poultry and horses. Each species is examined independently. Chapters 19-25 are concerned with swine production. Chapter 19 surveys the swine industry. Chapter 20 focuses upon swine reproduction, while feeding swine is the subject of Chapter 21. Chapter 22 deals with swine selection. Chapter 23 focuses upon the pork carcass and marketing. Swine management and swine health management are discussed in Chapters 24 and 25, respectively. The two appendices provide information on the proper composition of feeds and Canadian beef and pork grading systems.
TEXT OR REFERENCE

Title: SWINE COMPLEX MANAGEMENT COURSE GUIDE
Author: Darwin Miller
Publisher: Ellsworth Community College
1100 College Avenue
Iowa Falls, IA 50126
Year: Undated
No. of Pages: 70
Cost: Sample copies are available to community colleges at no charge

The purpose of this booklet is to serve as a reference and instructional guide for the Swine Complex Management course at Ellsworth Community College. The information is presented in eight chapters. Chapter 1 is concerned with breeding stock selection. Reproduction and reproductive efficiency are the subjects of Chapter 2. Basic nutrition is discussed in Chapter 3. Chapter 4 covers health and disease control. Breeding herd management is the focal point of Chapter 5. Housing, nutrition and health management are discussed in terms of breeding, gestation, pre-farrowing, farrowing, nursery and growing-finishing in Chapter 6. Chapter 7 focuses on records and business analysis. Employer/employee relations is the topic of Chapter 8. While this booklet is not available for purchase in quantity from Ellsworth Community College, other community colleges may obtain a sample copy and reproduce the material at their own expense.
TEXT OR REFERENCE

Title: SWINE INFORMATION SERVICE
Publisher: National Hog Farmer
1999 Shepard Road
St. Paul, MN 55116
Year: 1979
No. of Pages: N/A
Cost: $15.00 (individual order price)
$10.00 (educational institution bulk order price; minimum order is five copies)

This compilation contains nearly 200 National Hog Farmer articles of the last 20 years. The articles deal with a variety of subjects including breeding, reproduction, quality improvement, disease, nutrition, housing, equipment and management. The articles are reprinted on 8½ by 11 sheets and punched to fit any standard three-ring binder.
TEXT OR REFERENCE

Title: SWINE PRODUCTION
Authors: J.L. Krider and W.E. Carroll
Publisher: McGraw-Hill, Inc.
1221 Avenue of the Americas
New York, NY 10020
Year: 1971
No. of Pages: 528
Cost: $19.50

This book constitutes an extensive treatment of swine production. As pointed out in the authors' preface, a unique feature of the book is that it seeks to keep before the student the influence that various production practices have on profits. The 24 chapters are grouped into four major parts. Part I is concerned with organization of the swine operation as a factor in the cost of production, and focuses on the swine enterprise functions, swine characteristics and their production, the farm enterprise, and the number and kinds of hogs. Part II discusses the establishment of a swine enterprise and presents information on breeds and production costs, the physical and genetic bases for the selection of swine, performance testing and swine improvement, the physiology of swine reproduction, and breed management practices. Management as a factor in the cost of production is the focal point of Part III. Included in this part is information on various management systems, management practices which affect the number and quality of pigs weaned, factors affecting costs and profits in the weaning-to-market process and equipment and housing. Part IV is concerned with the feeding of swine and includes information on nutritional requirements, various types of food stuffs, ration formulation, feed preparation, feeding methods and marketing.
TEXT OR REFERENCE

Title: SWINE PRODUCTION IN TEMPERATE AND TROPICAL ENVIRONMENTS
Authors: W.G. Pond and J.H. Maner
Publisher: W.H. Freeman and Company
San Francisco, CA 94104
Year: 1974
No. of Pages: 646
Cost: $27.00

The purpose of this textbook is to provide a technical foundation upon which successful swine production can be performed in both temperate and tropical climates. The book is divided into 18 chapters plus appendices. Chapter 1 discusses the past, present and future of swine production. Chapter 2 reviews swine types, characteristics, behavior and other traits. The nutrient composition and other properties of pork that affect its acceptability as a food are described in Chapter 3. Chapter 4 presents the principles and methods of swine selection and breeding. Prenatal and postnatal development are discussed in Chapters 5 and 6, respectively. Chapter 7 examines general aspects of growth. Reproduction and lactation are the focal points of Chapters 8 and 9, respectively. Chapter 10 is concerned with feeding and nutrition, and Chapter 11 with feedstuffs and modern feed formulation. Sources of energy and protein are the subjects of Chapters 12 and 13, respectively. Chapter 14 discusses mineral and vitamin sources and non-nutritive feed additives. Chapter 15 describes food processing and its effect on nutritive value. Infectious diseases and parasites, metabolic and nutritional disorders and toxic substances are presented in Chapter 16. Chapter 17 discusses confinement production of swine. Chapter 18 focuses on swine management and marketing. The appendices contain conversion tables, weights and measures of common foods, a table of world swine and pork production, a 114-day gestation table, examples of sow and litter records, a directory of the swine industry, the composition of feeds commonly used in swine rations, sample diets for swine and a glossary.
TEXT OR REFERENCE

Title: SWINE SCIENCE
Author: M.E. Ensminger
Publisher: The Interstate Printers and Publishers, Inc.
Danville, IL 61832
Year: 1970
No. of Pages: 881
Cost: $19.95

This comprehensive textbook on swine production is divided into sixteen chapters. Chapter 1 presents the history and development of the swine industry. Chapter 2 discusses the geographical distribution of swine production, and the adaptation and future of the swine industry. The types and breeds of swine are reviewed in Chapter 3. Factors to be considered in establishing a swine herd, and the selection and judging of swine are the subjects of Chapter 4. Chapter 5 covers the breeding of swine. Chapters 6-9 are concerned with the feeding of and feeds (including pastures) for swine. The buildings and equipment necessary for swine production are reviewed in Chapter 10. In Chapter 11, swine health, disease prevention and parasite control are discussed. The marketing and slaughtering of hogs are examined in Chapter 12, while Chapter 13 describes the resultant pork and pork by-products. The management of a swine operation is discussed in Chapter 14. Chapter 15 reviews the business aspects of swine production. The book concludes in Chapter 16 with a discussion of selecting, fitting and showing swine. The eight appendices contain information on energy terms and feed compositions, animal units, weights and measures, gestations, all-time top sales, breed registry associations, breed magazines and State colleges of agriculture.
TEXT OR REFERENCE

Title: MIDWEST PLAN SERVICE CATALOG
Publisher: Midwest Plan Service
122 Davidson Hall
Iowa State University
Ames, IA 50011
Year: 1978
No. of Pages: 18
Cost: Free

This catalog contains plans for many of the types of facilities and equipment used in animal production and farming. In the swine area, the catalog contains reference to a swine handbook which has information on building systems, ventilation, waste management and equipment. Other types of swine-related plans which are available through the catalog are for siphon flush tanks; farrowing, nursery and finishing houses; and livestock waste management facilities.
CATALOG

Title: OHIO CURRICULUM MATERIALS
Publisher: Ohio Agricultural Education
Curriculum Materials Service
Room 254
2120 Fyffe Road
Columbus, OH 43210
Year: 1979
No. of Pages: 18
Cost: Free

The materials listed in this catalog were produced by the Ohio Agricultural Education Curriculum Materials Service. The content of the materials is based upon the knowledge, skills and abilities required to prepare the student for employment. The types of materials available include references, workbooks, color slide series, transparency series and teacher's guides. Swine production instructors and students would be interested in the materials on animal science, agricultural engineering, agricultural economics and agricultural occupations.
CATALOG

Title: TEACHING MATERIALS CATALOG, 1978-79
Publisher: Vocational Agriculture Service
College of Agriculture
University of Illinois
434 Munford Hall
Urbana, IL 61801
Year: 1979
No. of Pages: 9
Cost: Free

This catalog contains teaching materials developed primarily for use in agriculture classes at the secondary, postsecondary and adult levels. The catalog contains materials on a wide variety of agricultural subjects. Of particular interest to swine production instructors and students are the materials in the sections on animal science, agricultural economics, agricultural mechanics and agricultural business. The catalog contains pamphlets intended for student text and reference use, slide films, slide sets, transparencies, student study guides, cassette tapes, agribusiness selling series, agricultural career kits and oxacetylene series.
CATALOG

REFERENCES

Forgione, Pascal D., Jr. and A.L. Kopp. *Curriculum Development Needs for Vocational Education: New and Changing Occupational Areas*. Columbus, OH: The Ohio State University, The National Center for Research in Vocational Education, 1979.

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Meleen, Paulette S. and others. *Planning for Vocational Education: New and Emerging Occupations*. Belmont, MA: Contract Research Corporation, 1976.

Nelson, Orville. "Emerging occupations." *The Wisconsin Vocational Educator*, 1978, *4*, pp. 1-3.

Spetz, Sally H., W.D. Heath and D. Katz. *Current and Future Employment Opportunities in New and Emerging Occupations within Illinois*. Raleigh, NC: CONSERVA, Inc., 1978. (Sponsored by the Illinois State Board of Education.)

APPENDICES

19

APPENDIX A

SCHOOLS CONTACTED WHICH OFFER COURSEWORK IN SWINE CONFINEMENT MANAGEMENT

COLORADO

Fort Morgan Community College
Fort Morgan, CO 80701

IOWA

Ellsworth Community College
Iowa Falls, IA 50126

Hawkeye Institute of Technology
P.O. Box 8015
Waterloo, IA 50704

Kirkwood Community College
6301 Kirkwood Boulevard, SW
Cedar Rapids, IA 52406

ILLINOIS

Black Hawk College
East Campus
P.O. Box 489
Kewance, IL 61443

Kishwaukee College
Malta, IL 60150

SOUTH CAROLINA

Clemson University
College of Agricultural Sciences
Department of Animal Science
Clemson, SC 29631

APPENDIX B

INDIVIDUALS INDICATING AN INTEREST IN CONSULTING

Dr. Virgil Christensen
Hawkeye Institute of Technology
P.O. Box 8015
Waterloo, IA 50704
(319) 296-2320

Mr. Richard J. Juhl
Kirkwood Community College
6301 Kirkwood Boulevard, SW
Cedar Rapids, IA 52405
(319) 398-5517

Mr. Darwin Miller
Ellsworth Community College
Iowa Falls, IA 50126
(515) 648-4611

APPENDIX C

RELATED AGENCIES/ORGANIZATIONS

American Association of Swine Practitioners
Box K
Oneida, IL 61467
(309) 483-2891

American Feed Manufacturers Association, Inc.
1701 N. Fort Myer Drive
Arlington, VA 22209
(703) 524-0810

American Meat Institute
P.O. Box 3556
Washington, DC 20007
(703) 841-2400

Livestock Conservation Institute
1100 Jorie Boulevard
Suite 143
Oak Brook, IL 60521
(312) 323-1398

Midwest Plan Service
122 Davidson Hall
Iowa State University
Ames, IA 50011
(515) 294-4337

National Feeder Pig Dealers Association
Route 1
Grundy Center, IA 50638
(319) 824-6996

National Live Stock and Meat Board
444 North Michigan Avenue
Chicago, IL 60611
(312) 467-5520

National Pork Producers Council
4715 Grand Avenue
Des Moines, IA 50312
(515) 277-6419

National SPF Accrediting Agency
Conrad, IA 50621
(515) 366-2324

United States Animal Health Association
Suite 205
6924 Lakeside Avenue
Richmond, VA 23228
(804) 266-3275

APPENDIX D

SWINE FARMER COMPETENCIES

McClay, David R. *National Ag Competency Study*. Washington, DC: U.S. Department of Health, Education, and Welfare; Office of Education; Bureau of Occupational and Adult Education; 1978.

SWINE FARMER COMPETENCIES[1]

Competencies	Weighted Means[2]
1. Perform management practices	*2.7*
a. Select animals for breeding.	3.6
b. Purchase and produce swine that will utilize feeds efficiently for profit.	3.4
c. Care for baby pigs at birth.	3.4
d. Identify profitable characteristics of breeds.	3.1
e. Identify estrus.	3.1
f. Keep breeding records and farrowing records.	3.1
g. Care for sow or gilt at parturition.	3.1
h. Handle and care for sows and gilts at breeding.	3.0
i. Castrate pigs.	3.0
j. Repair and maintain buildings and equipment.	3.0
k. Identify principal body parts of the hog.	3.0
l. Determine proper space requirements at various levels.	3.0
m. Select animals for market.	2.9
n. Handle and care for boars at breeding.	2.9
o. Clip needle teeth.	2.9
p. Administer iron shots.	2.8
q. Analyze records for selection of breeding stocks.	2.8
r. Use a pressure sprayer to clean stalls and equipment.	2.8
s. Ear notch pigs.	2.7
t. Interpret test station data.	2.7
u. Develop adequate ventilation systems for buildings.	2.7
v. Crossbreed for hybrid vigor.	2.7
w. Clip tails.	2.6
x. Advise farmers on livestock selection, management, feeding and sanitation.	2.6
y. Judge a farmer's managerial and production potential.	2.5
z. Analyze the weaknesses and strengths in a farmer's operation and make suggestions that are acceptable to him/her.	2.5
aa. Balance litter numbers.	2.4
bb. Analyze and obtain specific information on any merchandise handled through use of catalogs and specification sheets.	2.3
cc. Identify the location of primal cuts of meat on live animal.	2.3
dd. Conduct a hog feeding survey.	2.0
ee. Probe hogs for back fat.	2.0
ff. Complete the registration procedures for registering purebred animals.	1.8
gg. Artificially inseminate sows and gilts.	1.3
2. Provide sanitary environment and practices for good animal health.	*3.1*
a. Identify sick animals.	3.7
b. Recognize symptoms of swine diseases.	3.6
c. Identify animals with parasite problems.	3.4
d. Determine and use management practices that will aid in preventing and controlling animal diseases and parasites.	3.4
e. Determine proper methods and treatments for parasites.	3.3
f. Disinfect pens and equipment.	3.3
g. Treat pigs for scours.	3.3
h. Dispose of animal wastes without causing environmental problems.	3.2
i. Disinfect boots and clothing.	3.2
j. Select and use sanitation products effectively.	3.2
k. Follow state health requirements.	3.1
l. Cull and isolate sick animals.	3.1
m. Vaccinate pigs.	3.0
n. Operate sprayers and mix spray for external parasite control.	3.0
o. Mix wormers into feed and feed safely.	3.0
p. Disinfect navels of pigs.	2.9
q. Mix liquid wormers.	2.4
r. Fill and discharge liquid manure wagon.	2.1
3. Market animals.	*2.9*
a. Determine the proper weight and quality of hogs to market.	3.5
b. Handle hogs to minimize bruises and shrink.	3.5
c. Select the market which will provide maximum return.	3.4
d. Estimate weight of hogs.	3.3
e. Sort and mark hogs for market.	3.3
f. Evaluate methods of marketing (grade and yield, live weight, etc.)	3.2
g. Interpret market reports from newspaper, radio or TV	3.1
h. Estimate the value of meatiness in a carcass.	3.1
i. Select a hauler for safe and careful handling.	3.1
j. Identify and justify economics of marketing at various weights.	3.1
k. Identify and use market trends and cycles in marketing.	3.0
l. Estimate market grades of hogs.	2.9
m. Evaluate carcass cut-out information.	2.9
n. Follow proper business procedures in marketing.	2.9
o. Interpret marketing receipts.	2.8
p. Gather and use outlook information.	2.7
q. Obtain and use futures market information.	2.7
r. Interpret test station data.	2.7
s. Operate scales and maintain scales.	2.6
t. Figure shrinkage on lots of hogs marketed.	2.5
u. Make futures market contacts when profitable.	2.3
v. Advertise for purebred hogs.	2.0
w. Interpret and use pedigrees on breeding stock purchases and sales.	2.0

[1] Responses from 31 Swine Farmers in 10 states. Survey conducted by Department of Agricultural Education, Iowa State University, Ames, Iowa 50010.

[2] 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4. Provide for proper feeding and nutrition. *2.9*
   a. Determine the nutrient requirements of different ages, sex, kind, and weight of swine. 3.5
   b. Determine proper feeding and watering space requirements. 3.5
   c. Calculate feed efficiency and costs of gain. 3.5
   d. Identify animals with nutritional deficiencies. 3.4
   e. Keep accurate production and feed records. 3.4
   f. Recognize the quality characteristics of grains and other feeds. 3.3
   g. Determine when to change composition of rations based on poor performance or cost. 3.2
   h. Determine the effects of feed additives. 3.2
   i. Determine mineral requirements needed for a ration. 3.2
   j. Determine the correct feed preparation and feed form for best performance at minimum cost. 3.2
   k. Adjust self-feeders. 3.2
   l. Interpret the information on a feed tag. 3.1
   m. Calculate total ration costs. 3.1
   n. Determine vitamin requirements needed for a ration. 3.1
   o. Operate scales accurately. 3.1
   p. Interpret feed standard tables. 3.0
   q. Identify and make use of the factors affecting the value and palatability of feeds. 3.0
   r. Determine amounts of feed additives to add to a mix and the cost of these additives. 3.0
   s. Interpret feed analysis reports. 3.0
   t. Install and adjust waterers. 3.0
   u. Know the upper and lower limits of certain feeds to include in a ration. 2.9
   v. Formulate a balanced ration by the Pearson square or other methods. 2.9
   w. Calculate nutrient cost per unit. 2.9
   x. Interpret results of feeding experiments. 2.9
   y. Observe and handle feed and equipment safely. 2.9
   z. Find and understand state and federal feed laws. 2.9
   aa. Formulate a least cost or least time ration. 2.8
   bb. Keep inventory reports. 2.8
   cc. Determine substitution rates and substitute feedstuffs in rations. 2.7
   dd. Determine different handling properties of grains and other feeds. 2.7
   ee. Identify storage factors to maintain quality of feeds and prevent contamination of harmful substances. 2.7
   ff. Operate and service grinding and mixing equipment. 2.6
   gg. Clean equipment and area used for preparing feeds. 2.6
   hh. Select proper feed grinding and mixing equipment. 2.5
   ii. Compute proper mixer batch quantities. 2.5
   jj. Operate and service bulk handling equipment. 2.5
   kk. Estimate amounts of materials by volume. 2.5
   ll. Complete forms necessary in mixing and handling formulated feeds. 2.5
   mm. Set metering regulators. 2.4
   nn. Operate the feed grinder and mixer. 2.3

5. Keep necessary records. *3.0*
   a. Use records to improve the swine enterprise. 3.5
   b. Enter figures into records properly. 3.4
   c. Develop short and long term goals. 3.3
   d. Interpret and develop a profit and loss statement. 3.1
   e. Complete an inventory. 3.1
   f. Set up and maintain breeding, farrowing, labor, and feed records. 3.1
   g. Determine a net worth statement. 3.1
   h. Develop short and long term budgets. 3.0
   i. Analyze complete enterprise analysis records. 2.9
   j. Identify data to keep in records. 2.7
   k. Develop an identification system for records. 2.7
   l. Operate calculators. 2.6
   m. Determine freight costs. 2.4

6. Practice safety procedures. *3.1*
   a. Sort and load hogs safely. 3.4
   b. Maintain equipment to prevent injury. 3.3
   c. Operate feed handling equipment properly and keep all protective shields in place. 3.3
   d. Ground all electrical equipment to prevent shock. 3.3
   e. Read and use operator manuals when installing or operating equipment. 3.3
   f. Store disinfectants, wormers, and other medications safely. 3.2
   g. Handle boars during breeding without injury. 3.1
   h. Handle sows with suckling pigs safely. 2.8
   i. Keep a record of accidents and needed cautions. 2.3

7. Practice good personal and human relations with employees and the general public. *3.2*
   a. Make decisions when necessary. 3.7
   b. Be a good listener. 3.7
   c. "Get along" with people. 3.7
   d. Communicate effectively. 3.6
   e. Follow and provide instructions. 3.6
   f. Work irregular hours occasionally. 3.6
   g. Develop self-confidence. 3.6
   h. Cooperate with fellow workers. 3.4
   i. Delegate responsibility when necessary. 3.4
   j. Sell yourself and the firm where you are employed. 3.3
   k. Identify factors that make for job success and satisfaction. 3.3
   l. Give needed advice diplomatically. 3.2
   m. Direct employees. 3.2
   n. Meet people easily. 3.1
   o. Work under stress. 3.1
   p. Evaluate performance continually. 3.1
   q. Dress appropriately for the job. 3.0
   r. Remember names and faces. 2.9
   s. Judge management and production potentials of people. 2.9
   t. Conduct group meetings or tours. 2.1

APPENDIX E

RELATED JOURNALS/PERIODICALS

AMERICAN HAMPSHIRE HERDSMAN
1111 Main Street
Peoria, IL 61606
Subscription Rate: $3.00
Issue Rate: Monthly.

AMERICAN LANDRACE
Culver Press
Culver, IN 46511
Subscription Rate: $2.00
Issue Rate: Bi-monthly.

ANIMAL NUTRITION AND HEALTH
83 Stevenson Street
San Francisco, CA 94105
Subscription Rate: $20.00
Issue Rate: Monthly.

BERKSHIRE NEWS
601 West Monroe Street
Springfield, IL 62704
Subscription Rate: $3.00
nonmembers, (American Berkshire Assn.)
Issue Rate: Monthly.

CHESTER WHITE JOURNAL
Chester White Swine Record Association
Box 228
Rochester, IN 46975
Subscription Rate: $3.00
Issue Rate: Monthly.

DROVERS JOURNAL
Vance Publishing Corporation
One Gateway Center
Kansas City, KS 66101
Subscription Rate: $6.00
Issue Rate: Weekly.

DUROC NEWS
United Duroc Swine Registry
1 803 W. Detweiller Drive
Peoria, IL 61614
Subscription Rate: $2.00
Issue Rate: Monthly.

FARM JOURNAL
230 W. Washington Square
Philadelphia, PA 19106
Subscription Rate: $3.00
Issue Rate: Monthly.

FEEDSTUFFS
Miller Publishing Co.
2501 Wayzata Boulevard
Box 67
Minneapolis, MN 55440
Subscription Rate: $18.50
Issue Rate: Weekly.

FEEDLOT MANAGEMENT
Miller Publishing Co.
2501 Wayzata Boulevard
Box 67
Minneapolis, MN 55440
Subscription Rate: $12.00
Issue Rate: Monthly.

HOG FARM MANAGEMENT
Miller Publishing Co.
2501 Wayzata Boulevard
Box 67
Minneapolis, MN 55440
Subscription Rate: $12.00
Issue Rate: Monthly.

NATIONAL HOG FARMER
Webb Co.
1999 Shepard Road
St. Paul, MN 55116
Subscription Rate: $6.00
Issue Rate: Monthly.

OIC NEWS
Greencastle, IN 46135

PIG INTERNATIONAL
Watt Publishing Co.
Sandstone Building
Mt. Morris, IL 61054
Subscription Rate: $10.00
Issue Rate: Monthly.

POLAND CHINA WORLD
1058 East Losey Street
Drawer 71
Galesburg, IL 61401
Subscription Rate: $2.00
Issue Rate: 7 issues/yr.

SPOTTED NEWS
National Spotted Swine Record, Inc.
Bainbridge, IN 46105
Subscription Rate: $3.00
Issue Rate: 10 issues/yr.

SUCCESSFUL FARMING
Meredith Corporation
1716 Locust Street
Des Moines IA 50336
Subscription Rate: $5.00
Issue Rate: Monthly.

TAMWORTH NEWS
Lacona, IN 50139

YORKSHIRE JOURNAL
American Yorkshire Club, Inc.
1001 South Street
Lafayette, IN 47902
Subscription Rate: $2.00
Issue Rate: 10 issues/yr.